

# Mini Conference

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## **Strengthening of RC Slabs and T-beams using Twin-anchor CFRP Strengthening System**

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# Motivation

Heavier vehicles → Sufficient load-bearing capacity?

## Solutions

### • Construction of new bridges:

- Costly
- Time-consuming
- Environmentally harmful

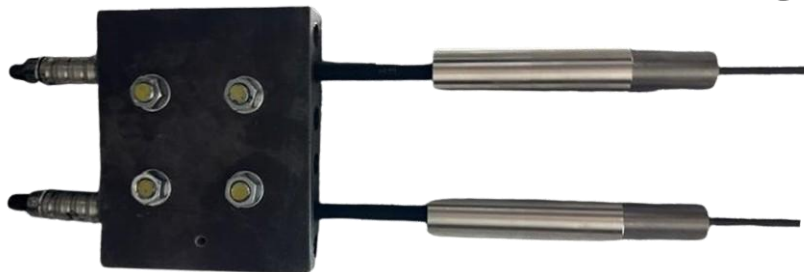


### • Strengthening

- Cheaper
- Time-efficient
- Environmentally friendly



### • Twin-anchor CFRP strengthening system



## CFRP

### Pros:

- Lightweight (5 x lighter than reinforcement steel)
- High tensile strength (5 x higher than reinforcement steel)
- High corrosion resistance

### Cons:

- Brittle
- Anisotropic

# Strengthening of Existing Bridges

- Carried out several tests
- Mounted onto RC geometries
- Main goal: efficiency of strengthening
- Four-point bending
- Tests results - ductile failures

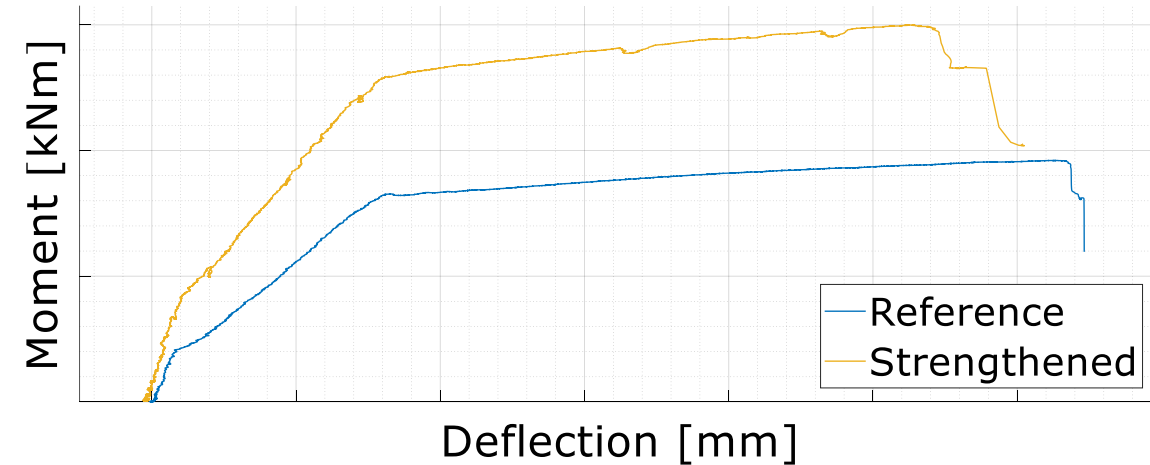


# Strengthening of Existing Bridges

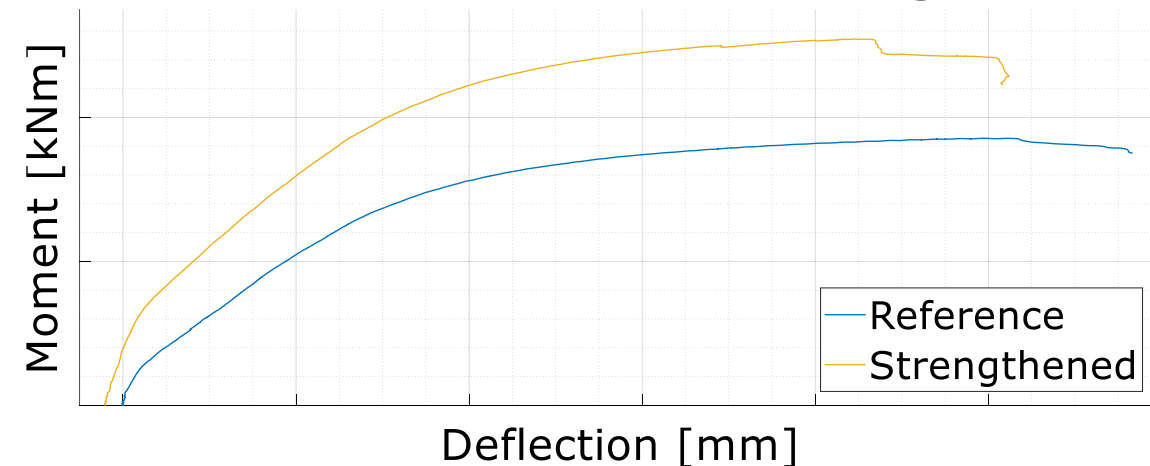


- Successful tests
- Increased and more ductile response
- Strengthening effects: up to 50 % in ultimate capacity
- System's potential for real-world applications

**Strengthening Effect on a Slab under Four-Point Bending**



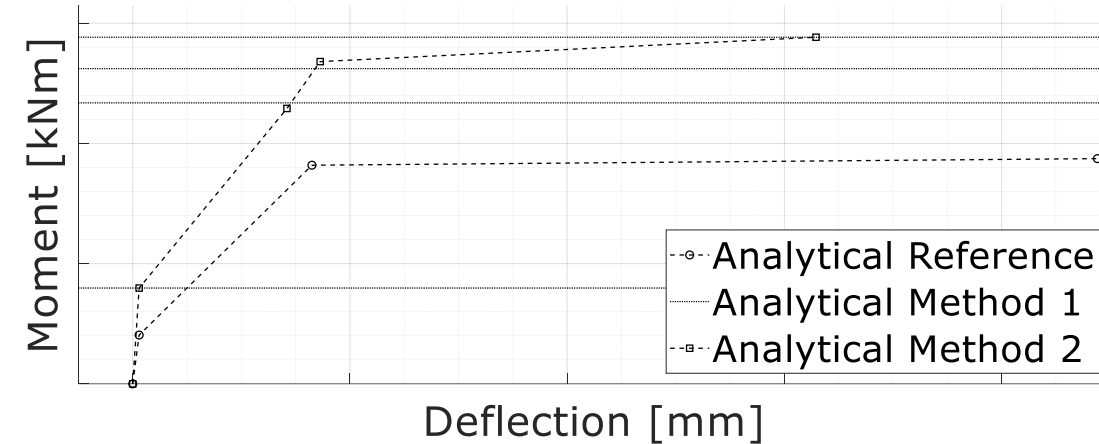
**Strengthening Effect on a T-beam under Four-Point Bending**



# Modelling of strengthening

- Input:
  - Material parameters
  - Concrete
  - Steel
  - CFRP
- Analytical approach
  - Two methods
- Numerical approach
  - Finite Element Software *DIANA*

**Twin-anchor CFRP Strengthening System Modelled on Slab**



**Twin-anchor CFRP strengthening system modelled on T-beam**

